

**SUMMARY ON
ENVIRONMENTAL IMPACT ASSESSMENT
REPORT**

OF

CHHATTISGARH STEEL & POWER LTD.

(Expansion Project)

at

Amjhar Village, Champa Tehsil, Janjgir-Champa District, Chhattisgarh.

Submitted to

CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

1.0 PROJECT DESCRIPTION

M/s. CHHATTISGARH STEEL & POWER LIMITED is an existing steel plant located at Amjhar Village, Champa Tehsil, Janjgir-Champa District, Chhattisgarh.

Environment Clearance was not applicable for existing plant, as the plant has been obtained Consent for Establishment in February 2006 (as per EIA Notification 1994, EC was required for projects with more than Rs.100 Crores of capital investment for Greenfield projects. Hence CTE has been obtained from CECB for existing plant).

Chronology of permission obtained:

- Obtained Consent for Establishment for FBC Power Plant 30 MW and Ferro alloy unit 2 x 16.5 MVA Induction Furnaces 3 x 8 T (72,000 TPA) from Chhattisgarh State Pollution Control Board (CECB) vide letter No.919/TS/C/2006 dated 22nd February 2006.
- Obtained CTO for 30 MW FBC Power Plant from Chhattisgarh State Pollution Control Board (CECB) vide letter No. 2135/TS/CECB/2008 dated 29th April 2008 and Obtained CTO for 2 x 16.5 MVA SEAF (Ferro Alloy Unit) from Chhattisgarh State Pollution Control Board (CECB) vide letter No.3563/TS/CECB/2013 dated 10th October 2013.
- Obtained Extension of CTE for Induction Furnaces – 3 x 8 T (72,000 TPA) for CTE expired on 01-05-2016 and extended upto 01-05-2020 (However Induction Furnaces – 3 x 8 T not implemented) from Chhattisgarh State Pollution Control Board (CECB) vide letter No.4422/TS/CECB/2018 dated 25th August 2018.
- Presently Existing plant in operation are FBC Power Plant 30 MW and SEAF (Ferro Alloy Unit) 2x16.5 MVA with CTO issued by Chhattisgarh State Pollution Control Board (CECB) vide letter No. 4730/TS/CECB/2023 dated 12th September 2023 and it is Valid up to 31st August 2026.

Proposed Project

Now the company proposed to Expansion of Steel Plant – consists of Upgradation of existing Ferro Alloy Unit from 2 x 16.5 MVA to 2 x 18 MVA (to produce FeSi– 28,000 TPA / FeMn- 60,000 TPA / SiMn- 54,000 TPA / FeCr- 54,000 TPA/ Pig Iron – 60,000 TPA), FBC Power Plant from 30 MW to 60 MW & proposed Ferro Alloy unit 2 x 9 MVA & 2 x 18 MVA (FeSi – 42,000 TPA / FeMn- 1,20,000 TPA / SiMn- 84,000 TPA / FeCr- 84,000 TPA/ Pig Iron – 1,20,000), DRI Kilns of 2x350 TPD (2,31,000 TPA of Sponge Iron), Sinter plant of 1x100 TPD (33,000 TPA of Sinters), Induction Furnaces of 4 x 15 MT (1,98,000 TPA of Hot Billets / MS

billets), Rolling mill of 2x270 TPD (1,78,200 TPA of TMT bars& Flats), Jigging plant of 4x10 TPH, WHRB Power Plant of 2x10 MW, Solar Power plant of 1.0 MW, AOD Converter of 1x18 MT, Briquetting unit of 1x100 TPD, Fly Ash Brick Manufacturing unit of 50,000 Bricks/ day).

Proposed expansion will be take-up partly in the existing plant of 22.50 Ha. (55.61 Acres) & partly in the adjoining additional land of 19.65 Ha.(48.55 Acres) located at Amjhar Village, Champa Tehsil, Janjgir-Champa District, Chhattisgarh. Total land after proposed expansion project will be 42.17 Ha. (104.16 Acres).

As per the Ministry of Environment, Forests & Climate Change, New Delhi, EIA notification dated 14th September, 2006 & its subsequent amendments, all Primary metallurgical processing industries are listed under S.No. 3(a), under Category 'A'.

In order to obtain Environmental Clearance for the proposed expansion of Steel plant, Form-I, proposed TOR along with Pre-Feasibility Report were submitted to the Honourable Ministry of Environment, Forests & Climate Change (MoEF&CC), New Delhi on 20th January 2024. Accordingly, TOR has been issued for the proposed expansion of steel plant vide No. **IA-J-11011/428/2023-IA-II (IND-I)** dated **21st March 2024**. Subsequently, Draft EIA report along with Executive Summary has been prepared incorporating the Terms of Reference issued & is submitted to Chhattisgarh State Pollution Control Board (CECB)for conducting Public hearing / consultation.

Pioneer Enviro Consultants Private Limited, Hyderabad, which is accredited by NABET, Quality Council of India, vide certificate No. NABET/EIA/2225/RA0282, for preparing EIA report for Metallurgical Unit, have prepared Draft Environmental Impact Assessment (EIA) report for the proposed expansion project by incorporating the TOR approved by Ministry of Environment, Forests & Climate Change, New Delhi. The report contains detailed description of the following:

- Characterization of status of environment with in an area of 10 km radius from the plant for major environmental components including air, water, noise, soil, flora, fauna and socio-economic environment.

- Assessment of air emissions, liquid waste and solid waste from the proposed expansion project along with the noise level assessment.
- Environmental Management Plan comprising of emission control measures proposed to be adopted in the proposed expansion project, solid waste management, Greenbelt development.
- Post Project Environmental Monitoring & Budget for Environmental Protection Measures.

1.1 ENVIRONMENTAL SETTING WITHIN 10 Km. RADIUS OF THE PLANT SITE

The following is the environmental setting within the 10 Km. radius of the Plant site:

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
1.	Type of Land	Partly Govt. land & partly Pvt. Land
2.	Type of Land (Study Area)	As per LULC the land use within 10 Km. is as follows: Settlements – 5.1 %; Industrial Area –6.3 %; Tanks / River / Major Canal etc. – 10.4%; Scrub forest – 6.4; Single crop land –48.8 %; Double Crop Land – 6.2 %; Land with scrub – 7.6 %; Land without scrub – 4.3%, Sheet quarry – 2.1 % ; Gullied land – 2.8%.
3.	National Park/ Wild life sanctuary / Biosphere reserve / Tiger Reserve / Elephant Corridor / migratory routes for Birds	There are no notified National Park/ Wild life sanctuary / Biosphere reserve / Tiger Reserve/ migratory routes for Birds with in 10 Km. radius of the plant.
4.	Historical places / Places of Tourist importance / Archeological sites	Nil
5.	Critically polluted area as per MoEF&CC Office Memorandum dated 13 th January 2010	Nil And also the Plant area does not fall in the areas given in Hon'ble NGT order issued vide dated 10 th July 2019.
6.	Defence Installations	Nil
7.	Nearest village	Amjhar Village – 0.1Kms(N) Pharaswani Village – 0.40Kms. (NE) Hamlet of Mahuda (V) – 0.1Kms. (SW)
8.	No. of Villages in the Study Area	93 nos.
9.	Nearest Hospital	Faraswani PHC– 1.5 Kms (NE)
10.	Nearest School	Saraipali 0.5 Kms (SE)
11.	Forests	Forests :- Open Mixed Jungle – 7.0 Kms Unnamed R.F – 9.40 Kms are existing within study area.

S.No.	Salient Features / Environmental features	Distance w.r.t. site / Remarks
12.	Water body	Hasdeo River – 0.3Kms. (W) Son Nadi– 3.9Kms (E) Champa Branch Canal – 1.1 Kms(E) Mahuda Village Pond – 0.4 Kms. Faraswani village pond – 1.3Kms. and other unnamed small ponds are existing within study area.
13.	Nearest Highway	National Highway # 149B @ 0.95 kms (E)
14.	Nearest Railway Station	Balpur RS – 2.6Kms.(E)
15.	Nearest Port facility	Nil within 10 Km. Radius.
16.	Nearest Airport	Nil within 10 Kms. Radius [Bilaspur Airport – 57.0 Kms.]
17.	Nearest Interstate Boundary	Nil within 10 Km. radius
18.	Seismic zone as per IS-1893	Seismic zone – II
19.	R & R	Not applicable as there are no habitations in the additional land proposed for expansion.
20.	Litigation / court case is pending against the proposed project / proposed site and or any direction passed by the court of law against the project	Nil

1.2 PLANT CONFIGURATION AND PRODUCTION CAPACITY

Following is the proposed plant configuration and proposed production capacities

TABLE NO. 11.1.1: EXISTING & PROPOSED PLANT CONFIGURATION & PRODUCTION CAPACITIES

S. No.	Unit (Product)	Total Capacity as per the CTE dated 22.02.2006 & 25.08.2018	Implementation status as per the current CTO dated 12/09/2023	Present Proposal Under Expansion	Total production capacity After Present Expansion
1.	DRI Kiln (Sponge Iron)	---	---	2,31,000TPA (2 x 350 TPD)	2,31,000TPA (2 x 350 TPD)
2.	Sinter Plant	---	---	33,000 TPA 1 x 100 TPD	33,000 TPA 1 x 100 TPD
3.	Induction furnace with LRF & CCM (Hot Billets / MS billets)	72,000 TPA (3 X 8 MT)	Not implemented (CFE expired)	1,98,000 TPA (4 x 15 MT)	1,98,000 TA (4 x 15 MT)
4.	Rolling Mill (TMT bars & Flats) (85 % Hot charging with Hot Billets and remaining 15% through RHF with	---	---	1,78,200 TPA (2x270 TPD)	1,78,200 TPA (2x270 TPD)

S. No.	Unit (Product)	Total Capacity as per the CTE dated 22.02.2006 & 25.08.2018	Implementation status as per the current CTO dated 12/09/2023	Present Proposal Under Expansion	Total production capacity After Present Expansion
	LDO as fuel)				
5.	Ferro Alloy unit (through SEAF) (FeSi/ FeMn / SiMn / FeCr)	2 x 16.5 (30,000 TPA) (FeSi –28,000 TPA / FeMn- 30,000 TPA / SiMn- 30,000 TPA / FeCr- 30,000 TPA)	2 x 16.5 (30,000 TPA) (FeSi – 28,000 TPA / FeMn- 30,000 TPA / SiMn- 30,000 TPA / FeCr- 30,000 TPA)	Upgradation of 2x16.5 MVA Furnaces to 2 x 18 MVA Production including existing FeSi– 28,000 TPA / FeMn- 60,000 TPA / SiMn- 54,000 TPA / FeCr- 54,000 TPA/ Pig Iron – 60,000 TPA) + New 2 × 9 MVA and 2 x 18 MVA (FeSi – 42,000 TPA / FeMn- 1,20,000 TPA / SiMn- 84000 TPA / FeCr- 84000 TPA/ Pig Iron – 1,20,000)	2 x 18 MVA upgradation 2 x 18 MVA(NEW) 2 x 9 MVA(NEW) Proposed production (FeSi– 70,000 TPA/ FeMn- 1,80,000 TPA / SiMn- 1,38,000 TPA / FeCr- 1,38,000 TPA/ Pig Iron – 1,80,000 TPA) Total production of all products together not exceeding 1,80,000 TPA
6.	Jigging Plant	---	---	10,000 TPA (4 x 10 TPH)	10,000 TPA (4 x 10 TPH)
7.	Briquetting Unit	---	---	33,000 TPA (1 x 100 TPD)	33,000 TPA (1 x 100 TPD)
8.	Power generation through WHRB of DRI	--	--	2 x 10 MW	2 x 10 MW
9.	Power Plant through CFBC	1 x 30 MW (1x 130 TPH)	1 x 30 MW (1x 130 TPH)	1 X 30 MW (1x 130 TPH)	2 X 30 MW (2x 130 TPH)
10.	Solar Power Plant	---	---	1.0 MW	1.0 MW
11.	AOD Converter	---	---	66,000 TPA (1 x 18 MT)	66,000 TPA (1 x 18 MT)
12.	Fly Ash Brick making unit	---	---	50,000 Bricks/Day	50,000 Bricks/Day



1.3 RAW MATERIAL REQUIRMENT

The following will be the raw material requirement for the proposed project:

RAW MATERIAL REQUIREMENT, SOURCE & MODE OF TRANSPORT

S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
1.	For DRI Kilns (Sponge Iron) – 2,31,000 TPA				
a)	Iron ore (100%)	3,69,600	Odisha, Chhattisgarh, Jharkhand & Imported	~ 600 Kms.	By rail & road (covered trucks)
a)	Imported Coal	2,31,000	South Africa	~ 600 Kms.	Through sea route, rail route & by road (covered trucks)
c)	Dolomite	11,550	Chhattisgarh	~ 200 Kms.	By rail & road (covered trucks)
2.	For Steel Melting Shop (Billets/ Ingots/Hot Billets) – 1,98,000 TPA				
a)	Sponge Iron	1,98,000	In-house Generation	---	Through covered conveyers
b)	Pig Iron	14,850	In-house Generation	---	Covered trucks
c)	MS Scrap	34,650	In-house Generation	---	Covered trucks
d)	Ferro alloys	3,960	In-house Generation	---	By road (covered trucks)
3.	For Rolling Mill through Hot charging (Rolled Products) –1,78,200TPA				
a)	Hot Billets /Billets/Ingots	1,87,110	In-house Generation	---	By conveyer
b)	LDO / LSHS	866	Chhattisgarh	100 Kms.	By road (through tankers)
4.	For CFBC Boiler [Power Generation 1 X 30 MW]				
a)	Dolochar + Imported Coal	Dolochar	In-house Generation	---	through covered conveyers
		Imported Coal	1,08,768	Indonesia / South Africa / Australia	~ 600 Kms.
5.	For Sinter Plant – 33000 TPA				
a)	Mn Ore/Iron Ore Fines	28941	Odisha, Chhattisgarh & Jharkhand	~ 500 Kms.	By rail & road (Covered trucks)
b)	Limestone	3300	Chhattisgarh	~ 300 Kms.	By rail & road (covered trucks)
c)	High Mg lime	1155	Chhattisgarh	~ 300 Kms.	

S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
d)	Coke Powder	3300	Odisha & West Bengal	~ 600 Kms.	By rail & road (Covered trucks)
6.	For Ferro Alloys (after Upgradation of 2 x 16.5 MVA to 2 x 18 MVA, 2x 9 MVA& 2 X 18 MVA)				
7 (i)	For Ferro Silicon – 70,000 TPA				
a)	Quartz	1,54,000	Chhattisgarh / Andhra Pradesh	~ 600 Kms.	By road (covered trucks)
b)	Mill Scale& M.S. Scrap	31,500	Inhouse Generation	---	---
c)	Coke	1,08,500	Chhattisgarh Imported from Australia, China	~ 300 Kms. ~ 600 Kms. (from Vizag Port)	By Road (Covered trucks) From Vizag Port by Road (Covered Trucks)
d)	Electrode paste	7,000	Maharashtra / West Bengal	~ 350Kms	Road (Covered Trucks)
e)	Briquetted Bag filter dust	4,900	Inhouse Generation	---	---
7 (ii)	For Ferro Manganese – 1,80,000 TPA				
a)	Manganese Ore	4,32,000	MOIL / OMC	~ 350 Kms.	By Rail & Road (covered trucks)
b)	Coke	54,000	Chhattisgarh / Bihar Imported from Australia, China	~ 500 Kms. ~600 Kms. (from Vizag Port)	By Road (Covered trucks) From Vizag Port by Road (Covered Trucks)
c)	MS scrap / Mill scales	36,000	Inhouse Generation	---	By road (covered trucks)
d)	Electrode paste	3,960	Maharashtra / West Bengal	~ 350 Kms.	By road (covered trucks)
7 (iii)	For Silico Manganese – 1,38,000 TPA				
a)	Manganese Ore	2,76,000	MOIL / OMC	~ 350 Kms.	By Rail & Road (covered trucks)
b)	FeMn Slag	62,100	In house generation	---	----
c)	Coke	41,400	Chhattisgarh / Bihar Imported from Australia, China	~ 500 Kms. ~ 600 Kms. (from Vizag Port)	By Road (Covered trucks) From Vizag Port by Road (Covered Trucks)
d)	Dolomite	41,400	Chhattisgarh / Andhra Pradesh	~ 600 Kms.	By road (covered trucks)

S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
e)	Electrode paste	2,760	Maharashtra / West Bengal	~ 350 Kms.	By road (covered trucks)
f)	Quartz	48,300	Chhattisgarh / Andhra Pradesh	~ 600 Kms.	By road (covered trucks)
g)	Briquetted Bag filter dust	2,070	In house generation	---	---
7 (iv)	For Ferro Chrome – 1,38,000 TPA				
a)	Chrome Ore	3,31,200	Sukinda, Odisha Imported	~ 350 Kms. ~ 600 Kms. (from Vizag Port)	By road (covered trucks) From Port By Road (covered Trucks)
b)	Coke	69,000	Chhattisgarh / Bihar Imported from Australia, China	~ 500 Kms. ~ 600 Kms. (from Vizag Port)	By Road (Covered trucks) From Vizag Port by Road (Covered Trucks)
c)	Quartz	8,418	Chhattisgarh / Andhra Pradesh	~ 600 Kms.	By road (covered trucks)
d)	MS Scrap / Mill Scale	20,700	Inhouse Generation	---	---
e)	Magnetite / Bauxite	20,700	Chhattisgarh / Maharashtra	~ 350 Kms.	By road (covered trucks)
f)	Electrode Paste	2,760	Maharashtra / West Bengal	~ 350 Kms.	By road (covered trucks)
g)	Briquetted Bag filter dust	2,760	Own generation	---	---
7 (v)	For Pig Iron – 1,80,000 TPA				
a)	Iron Ore	1,97,100	Sukinda, Odisha Import, South Africa	~ 350 Kms. ~ 600 Kms. (from Vizag Port)	By road (covered trucks) From Port By Road (covered Trucks)
b)	Mill Scale	1,17,000	Inhouse Generation	---	---
c)	Coke	1,13,040	Chhattisgarh / Bihar Imported from Australia, China	~ 500 Kms. ~ 600 Kms. (from Vizag Port)	By Road (Covered trucks) From Vizag Port by Road (Covered Trucks)
d)	Limestone	27,000	Chhattisgarh	~ 300 Kms.	By rail & road (covered trucks)
e)	Fluorspar	4,500	Chhattisgarh	~ 300 Kms.	By Road (Covered trucks)

S.No.	Raw Material	Quantity (TPA)	Sources	Distance from site (in Kms.)	Mode of Transport
f)	Dolomite	27,000	Chhattisgarh / Andhra Pradesh	~ 600 Kms.	By road (covered trucks)

1.4 MANUFACTURING PROCESS

1.4.1 Sponge Iron (DRI)

It is a coal-based plant for converting Iron Ore to Iron through direct reduction. The Oxide Ore Fe_2O_3 (Hematite) is reduced to 'Fe' by using Carbon as reductant. The process can take place at 900-1000°C. Coal provides the heat as well as reducing gases. Dolomite chips of size (-3 mm) are used as flux to Scavenge Sulphur content from coal and preventing the combining of this impurity with iron. The process is carried out in a Rotary Kiln.

The Direct Reduced Iron (DRI) plant will comprise of kilns and related accessories including Waste Heat Recovery power generating unit.

The major plant facilities for the Sponge Iron plant envisaged are as follows:

- Day bins
- Rotary Kiln & Cooler
- Central Control Room
- Product processing and product storage
- Off gas system including waste heat recovery power generation

There will be one day bin building for kiln. The day bin building will have bins for meeting raw material required for kiln. This bin will have the storage facility for pellets, feed coal, dolomite etc.

A refractory lined rotary kiln will be used for reduction of Iron ore in solid state. A central Burner located at the discharge end will be used for initial heating of the kiln. Sized Iron ore will be continuously fed into the kiln along with coal which has dual role of fuel as well as reductant. Dolomite will be added to scavenge the Sulphur from the coal. A number of air tubes will be provided along the length of the kiln.

The desired temperature profile will be maintained by controlling the volume of the combustion air through these tubes. The Carbon monoxide generated due to the combustion of coal, reduces the iron ore and converts it into sponge iron. The rotary kiln is

primarily divided into two zones viz. the pre heating zone and the reduction zone. The preheating zone extends over 30 to 50 % of the length of the kiln and in this the moisture in the charge will be driven off and the volatile matter in the coal will be burnt with the combustion air supplied through the air tubes. Heat from the combustion rises the temperature of the lining and the bed surface. As the kiln rotates, the lining transfers the heat to the charge. Charge material, pre-heated to about 1000°C enters the reduction zone. Temperature of the order of 1050°C will be maintained in the reduction zone, which is the appropriate temperature for solid state reduction of iron oxide to metallic iron. This hot material will be transferred to rotary cooler. In rotary cooler the material will cool from 1000°C to 100°C in cooler by spraying water. The cooler discharge material consists of sponge iron lumps, sponge iron fines and char. Magnetic and non-magnetic material will be separated through magnetic separators and stored in separate bins

1.4.2 Steel Melting Shop

In Steel Melting Shop (SMS), Sponge Iron will be melted along with melting scrap and fluxes to make pure liquid steel and then to mould it in required size billets. The SMS will consist of Induction furnace, Ladles, Cranes & Continuous Casting Machine (CCM). Either the Hot Billets produced from LRF will be directly sent to Rolling Mill without using Re-heating Furnace through Hot charging method (or) M.S. Billets / M.S. Ingots will be sent to Re-heating Furnace to reheat the Billets and then sent to Rolling Mill to manufacture Rolled Products.

1.4.3 Rolling Mill (Long Product and Flat Product)

The Hot Billets produced from Induction Furnaces will be directly sent to Rolling Mill to produce Rolled Products (OR) Hot Billets will be cooled and stored will be sent to reheating furnaces for the heating and will be sent to Rolling Mill. Furnace will be heated with LDO / LSHS.

1.4.4 Ferro Alloys Unit

Submerged Electric Arc Furnace will be setup in the proposed plant. Ferro manganese, silicon-manganese will be produced using manganese ore as main raw material, Ferro silicon will be produced using Quartz as main raw material & Ferro Chrome will be

produced using Chrome Ore as main raw material in a sub-merged arc furnace using reducer (Coke) under high voltage. Flue gases will be extracted through 4th hole and then treated in bag filters.

1.4.5 Power Generation

Through WHRB Boiler

WHR Boilers will be installed to 2x 350 TPDDR Kilns to generate 2x10 MW Power. The gases after heat recovery will pass through ESP and then discharged through chimneys into the atmosphere for effective dispersion of emissions into the atmosphere through stacks of adequate height.

Through FBC Boiler

Coal (Imported) along with dolochar will be used as fuel in FBC Boiler to generate 1 x 30MW of electricity. The flue-gases will be treated in high efficiency ESP and then discharged through a stack of adequate height into the atmosphere.

1.4.6 Zigging Plant

Ferro chrome recovery process involves the following steps

Crushing & screening: In this slag is crushed to smaller size particles as close as possible

Coarse jigging: In this particles having coarse fraction (approximately -32 to -3mm) is separated through two stage air pulsated jig for recovery of metal.

Fine jigging: In this particles of fine fraction (-3mm) is separated through diaphragm pulsed (through the bed' jigs for recovery of metal.)

The recovered metal will be reused in the process.

1.4.7 Briquetting Plant

Chromites ore Fines and concentrates cannot be charged directly into the smelting furnace, especially closed top submerged arc furnace for reason of safety and bad performances. The fines are therefore agglomerated for improving the smelting condition. Various processes are available for agglomeration- sinter pellet, briquettes and chrome ore sinter, the first two process being most widely used. As explained in Figure below, the chrome ore fines received from mines are first dried in dryer. The dry ore is mixed with

molasses, and the green mix is then fed to the briquetting presses. The presses compact the mixture at high pressure to form green briquettes. The green briquettes are stored in the storage yard for curing. After curing at ambient temperature for 24- 48 hrs, the briquettes become stronger and are fed into Submerged Arc Furnaces.

1.4.8 Sinter Plant

Sintering or frottage is the process of compacting and forming a solid mass of material by heat or pressure without melting it to the point of liquefaction.

The atoms in the materials diffuse across the boundaries of the particles, fusing the particles together and creating one solid piece. Because the sintering temperature does not have to reach the melting point of the material, sintering is often chosen as the shaping process for materials with extremely high melting points.

1.4.9 AOD Converter

AOD is part of a duplex process in which scrap or virgin raw materials are melted in an electric arc or induction furnace and subsequently decarburized and refined in a special AOD vessel. Controlled injection of oxygen mixed with argon or nitrogen through submerged tuyeres and top lance decarburizes the molten metal with a minimum of unwanted metallic oxidation. De-oxidation, desulfurization (in the case of low alloy steels, dephosphorization), and recovery of desirable metals from the slag are carried out in the AOD vessel. Degassing, homogenization, and inclusion flotation proceed continuously throughout all stages of the process to produce a clean and uniform product.

1.5 Water Requirement

- Water required for existing operating plant is 1690 KLD and same is being sourced from Hasdeo river. Water required for proposed expansion project will be 4104 KLD and the same will be sourced from Hasdeo river.
- Total water requirement after the proposed expansion will be **5734 KLD**.
- Water cooled condensers in the existing plant will be converted to Air cooled condensers. In expansion project also Air cooled condensers will be provided.
- Water for existing plant is sourced from Hasdeo river and same will be for proposed expansion.

- Water Permission obtained for 4,109 KLD from Water Resources Department, Govt. of Chattisgarh for a period of 30 years from 03-12-2009.
- Water drawl permission for Additional Quantity will be obtained from Water Resource Department of Chhattisgarh

BREAK-UP OF WATER REQUIREMENT

S.No.	Unit	Quantity in KLD		
		Existing Plant (under operation)	Proposed Expansion	Total after Proposed Expansion
1.	DRI Kilns	---	560	560
2.	Induction Furnace	---	270	270
3.	Rolling Mill	---	108	108
4.	Captive Power Plant	1620	2700	4320
5.	Solar Power Plant	---	2	2
6.	Ferro alloys unit	60	360	420
7.	Sinter Plant	---	20	20
8.	Jigging Plant	---	4	4
9.	Briquetting Unit	---	20	20
10.	Brick Manufacturing plant	---	10	10
11.	Domestic	10	50	60
	Total	1690	4104	5734

1.6 Waste Water Generation

Existing

- There is no wastewater discharge from the existing operating Sponge Iron, as Closed-circuit cooling system is being adopted.
- Waste water from Rolling is treated in oil separator followed by settling tank.
- Wastewater from Induction Furnace, Power Plant will be treated in ETP and after treatment it will be utilized for greenbelt development.
- Sanitary wastewater is being treated in Septic tank followed by Soak pit.
- Zero liquid effluent discharge is being maintained in the existing plant.

Proposed

- There was no effluent discharge from the existing DRI Unit, Sinter plant as Closed circuit cooling system adopted.
- Effluent from SMS, Rolling mill, Ferro Alloy and power plant will be treated in ETP.

- The wastewater generated will be treated in ETP followed by RO plant. Treated effluent & RO rejects will be utilized for Cooling tower Makeup, for Dust suppression in CHP, for Ash Conditioning, Floor washing, Vehicle washing & for Greenbelt development.
- Sanitary wastewater generated from proposed expansion project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- There will not be any effluent discharge outside the premises.
- During monsoon period, the treated wastewater will be utilized as makeup water for Rolling Mill.
- Garland drains will be provided around all the raw material stacking areas.
- No effluent will be let out of the plant premises. Zero effluent discharge will be implemented.

BREAKUP OF WASTE WATER GENERATION

S.No.	Source	Generation (KLD)		
		Existing Plant (under operation)	Proposed Expansion	Total after Proposed Expansion
1.	DRI Kilns	---	---	---
2.	Induction Furnaces	---	17	17
3.	Rolling Mill	---	8	8
4.	Ferro Alloys Unit	5	21	21
5.	Brick manufacturing plant	---	---	---
6.	Briquetting Plant	---	---	---
7.	Power Plant			
	a) Cooling Towerblowdown	195	325	520
	b) Boilers blowdown	164	274	438
	c) D.M. plant regeneration water	256	425	681
8.	Sanitary Wastewater	8	40	48
	Total	628	1110	1733

1.7 Wastewater Characteristics

The following are the Characteristics of waste water.

CHARACTERISTICS OF EFFLUENT

PARAMETER	CONCENTRATION			
	Cooling Tower blowdown	DM Plant Regeneration	Boiler Blowdown	Sanitary waste water
pH	7.0 – 8.0	5.0 – 10.0	9.5 – 10.5	7.0 – 8.5

BOD (mg/l)	--	--	--	200 – 250
COD (mg/l)	--	--	--	300 – 400
TDS (mg/l)	1000	5000 – 6000	1000 mg/l	800 – 900
Oil & Grease (mg/l)	--	10	--	5 - 10
TSS (mg/l)	--	--	--	150-200

2.0 DESCRIPTION OF ENVIRONMENT

Base line data has been collected on ambient air quality, water quality, noise levels, flora and fauna and socio economic details of people within 10 km radius of the plant.

2.1 Ambient air quality

Ambient air quality was monitored for PM_{2.5}, PM₁₀, SO₂, NO_x & CO at 8 stations including project site during **1st Dec 2023 to 29th Feb 2024**. The following are the concentrations of various parameters at the monitoring stations:

AAQ DATA SUMMARY

S.No.	Parameter	Concentration range	Standard as per NAAQS
1.	PM _{2.5}	25.4 to 45.9 µg/m ³	60
2.	PM ₁₀	43.4 to 76.9 µg/m ³	100
3.	SO ₂	9.3 to 18.9 µg/m ³	80
4.	NO _x	9.9 to 34.5 µg/m ³	80
5.	CO	493 to 1292 µg/m ³	2000

2.2 Water Quality

2.2.1 Surface Water Quality

Hasdeo River (0.3 Kms. – West direction), Son Nadi (3.9 Kms. – East direction) & Champa Branch Canal (1.1 Kms. – East direction), Mahuda viilage pond (0.4 Kms), Faraswani village pond(1.3 Kms) are present within 10 Km. radius of the project site.

4 no. of samples i.e. 60m Upstream of Hasdeo river & 60 m Downstream from Hasedo River, One sample from Son Nadi and Champa Branch Canal have been collected and analyzed for various parameters. The analysis of samples shows that all the parameters are in accordance with BIS-2296 specifications.

2.2.2 Ground Water Quality

8 No. of ground water samples from open wells / bore wells were collected from the nearby villages to assess ground water quality impacts and analyzed for various Physico-

Chemical parameters. The analysis of samples shows that all the parameters are in accordance with BIS: 10500 specifications.

2.3 Noise Levels

Noise levels were measured at 8 locations during day time & Night time. The noise levels at the monitoring stations are ranging from **47.73 dBA to 70.20 dBA**.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.1 Prediction of impacts on air quality

The predicted max. incremental PM_{2.5} concentrations (24 hourly) due to the emissions from operation of proposed expansion project will be **1.06 µg/m³** at a distance of 2990 m from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in PM_{2.5} concentration due to the Vehicular emission will be **0.41 µg/m³**.

The predicted max. incremental PM₁₀ concentrations (24 hourly) due to the emissions from operation of proposed expansion project will be **1.67 µg/m³** at a distance of 3990 m from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in PM₁₀ concentration due to the Vehicular emission will be **0.69 µg/m³**.

The predicted max incremental SO₂ concentrations (24 hourly) due to the emissions from operation of proposed expansion project will be **2.76 µg/m³** at a distance of 3780 m from the stack in the down wind direction over the baseline concentrations.

The predicted max incremental NO_x concentrations (24 hourly) due to the emissions from operation of proposed project will be **6.37 µg/m³** at a distance of 2990 m from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in NO_x concentration due to the Vehicular emission will be **5.13 µg/m³**.

The predicted max incremental CO concentrations (24 hourly) due to the emissions from operation of proposed project will be **0.94 $\mu\text{g}/\text{m}^3$** at a distance of 3290 m from the stack in the down wind direction over the baseline concentrations.

The predicted incremental rise in CO concentration due to the Vehicular emission will be **3.32 $\mu\text{g}/\text{m}^3$** .

NET RESULTANT MAXIMUM CONCENTRATIONS DURING THE OPERATION OF THE PROPOSED EXPANSION PROJECT

Item	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO _x ($\mu\text{g}/\text{m}^3$)	CO ($\mu\text{g}/\text{m}^3$)
Maximum baseline conc. in the study area	45.9	76.9	18.9	34.5	1292
Maximum predicted incremental rise in concentration due to proposed expansion project (Point Source)	1.06	1.67	2.76	6.37	0.94
Maximum predicted incremental rise in concentration due to proposed expansion project (Vehicular Emissions)	0.41	0.69	---	5.13	3.32
Net resultant concentrations during operation of the proposed expansion project	47.37	79.26	21.66	46.0	1296.26
National Ambient Air Quality Standards	60	100	80	80	2000

The net resultant Ground level concentrations during operation of the expansion project are within the NAAQS. Hence there will not be any adverse impact on air environment due to the proposed expansion project.

3.2 Prediction of impacts on Noise quality

The major sources of noise generation in the proposed project will be STG, boilers, compressors, DG set, etc. Acoustic enclosures will be provided to the STG. The ambient noise levels will be within the standards prescribed by MoEF vide notification dated 14-02-2000 under the Noise Pollution (Regulation & Control), Rules 2000 i.e. the noise levels will be less than 75 dBA during day time and less than 70 dBA during night time. **14.26 Ha. (35.21 Ac.)** of extensive greenbelt will be developed (**inclusive of existing**) to further attenuate the noise levels. Hence there will not be any adverse impact due to noise on population in surrounding areas due to the proposed expansion project.

3.3 Prediction of impacts on Water Environment

- There was no effluent discharge from the existing DRI Unit, Sinter plant as Closed circuit cooling system adopted.
- Effluent from SMS, Rolling mill, Ferro Alloy and power plant will be treated in ETP.
- The wastewater generated will be treated in ETP followed by RO plant. Treated effluent & RO rejects will be utilized for Cooling tower Makeup, for Dust suppression in CHP, for Ash Conditioning, Floor washing, Vehicle washing & for Greenbelt development.
- Sanitary wastewater generated from proposed expansion project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- There will not be any effluent discharge outside the premises.
- During monsoon period, the treated wastewater will be utilized as makeup water for Rolling Mill.
- Garland drains will be provided around all the raw material stacking areas.
- No effluent will be let out of the plant premises. Zero effluent discharge will be implemented.

Hence there will not be any adverse impact on environment due to the proposed expansion project.

3.4 Prediction of Impacts on Land Environment

The effluent will be treated to achieve SPCB standards. Zero effluent discharge will be adopted. All the required air pollution control systems will be provided to comply with CPCB / SPCB norms. All solid wastes will be disposed / utilized as per CPCB / SPCB norms. **14.26 Ha. (35.21 Ac.)** of extensive greenbelt will be developed (**inclusive of existing**) as per guidelines. Hence, there will not be any adverse impact on land environment due to the proposed expansion project.

3.5 Socio - Economic Environment

There will be further upliftment in Socio Economic status of the people in the area. Hence, there will be further development of the area due to the proposed expansion project.

Due to this the economic conditions, the educational and medical standards of the people living in the study area will certainly move upwards which will result in overall economic

development, improvement in general aesthetic environment and increase in business opportunities.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

Post project monitoring will be conducted as per the guidelines of SPCB and MoEF&CC are tabulated below:

MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

S.No.	Particulars	Frequency of Monitoring	Duration of sampling	Parameters required to be monitored
1. Water & Waste water quality				
A.	Water quality in the area	Quarterly Once	Grab sampling	As per IS: 10500
B.	Effluent at the inlet & outlet of the ETP	Once in a month	Composite Sampling	As per EPA Rules, 1996
C.	Sanitary Wastewater (inlet & outlet of STP)	Once in a month	Composite Sampling	As per EPA Rules, 1996
2. Air Quality				
A.	Stack Monitoring	CEMS (all Stacks) Once in a month	-- --	PM, SO ₂ & NO _x PM, SO ₂ & NO _x
B.	Ambient Air quality	CAAQMS Quarterly Once	continuously 24 Hourly	PM _{2.5} , PM ₁₀ , SO ₂ , NO _x PM _{2.5} , PM ₁₀ , SO ₂ , NO _x & CO
C.	Fugitive emissions	Once in a Month	8 hours	PM
3. Meteorological Data				
A.	Meteorological data to be monitored at the plant.	Daily	Continuous monitoring	Temperature, Relative Humidity, rainfall, wind direction & wind speed.
4. Noise level monitoring				
A.	Ambient Noise levels	Once in a month (Hourly)	Continuous for 24 hours with 1-hour interval	Noise levels
5. Soil Quality monitoring				
A.	Soil Quality	Half yearly once	Core drilling sample	pH, SAR, texture, N,P,K, etc

5.0 ADDITIONAL STUDIES

No Rehabilitation and Resettlement is involved in the proposed expansion project as there are no habitations in the additional land proposed. Hence no R & R study has been carried out.

6.0 PROJECT BENEFITS

With the establishment of the proposed project employment potential will increase. Land prices in the area will increase. The economic status of the people in the area will improve due to the proposed project. Periodic medical checkups will be carried out. Top priority will be given to locals in employment. Separate budget will be allocated for social welfare & developmental activities to develop the surrounding villages.

7.0 ENVIRONMENT MANAGEMENT PLAN

7.1 Air Environment

The following are air emission control systems proposed in the proposed project:

S.No.	Source	Control Equipment	Emission at the outlet
1.	DRI kilns with WHRB's (2 x 350 TPD)	Electro Static Precipitators (ESP) - 2 nos.	PM <30 mg/Nm ³
2.	Induction Furnaces (4 x 15 T)	Fume Extraction system with PTFE bag filters - 4 nos.	PM < 30 mg/Nm ³
3.	Re-heating furnaces attached to Rolling Mill	Stack	PM < 30 mg/Nm ³
4.	Submerged Electric Arc Furnace (2 x 18 MVA and 2 x 9 MVA)	4 th Hole Fume Extraction system with bagfilters – 4 nos.	PM < 30 mg/Nm ³
5.	FBC Boiler	Electro Static Precipitators – 1 no. (High Performance rigid electrodes)	PM < 30 mg/Nm ³
		Limestone will be used as bed material and act as sulphur absorbent.	SOx<100 mg/Nm ³
		Combustion temperature will be around 800-850 ⁰ C, which is not conducive for thermal NOx formation. Low NOx burners with 3-stage combustion, flue gas recirculation and auto combustion control system will be provided.	NOx<100 mg/Nm ³

Note : Apart from the above Fume extraction system with bagfilters, dry fog system, dust suppression system, covered conveyers, water cannon spray, Wheel washing at entry and exit gates etc. will also be provided.

7.2 Water Environment

Existing

- Effluent from Ferro Alloy and power plant will be treated in ETP.

- The wastewater generated from Power plant will be treated in ETP followed by RO plant. Treated effluent & RO rejects is being utilized for Dust suppression in CHP, for Ash Conditioning, for Greenbelt development.
- Sanitary wastewater, which was treated in Septic tank.
- Zero liquid effluent discharge was maintained in the existing plant.

Proposed

- There was no effluent discharge from the existing DRI Unit, Sinter plant as Closed circuit cooling system adopted.
- Effluent from SMS, Rolling mill, Ferro Alloy and power plant will be treated in ETP.
- The wastewater generated will be treated in ETP followed by RO plant. Treated effluent & RO rejects will be utilized for Cooling tower Makeup, for Dust suppression in CHP, for Ash Conditioning, Floor washing, Vehicle washing & for Greenbelt development.
- Sanitary wastewater generated from proposed expansion project will be treated in proposed STP and after treatment the treated sewage will be used for greenbelt development.
- There will not be any effluent discharge outside the premises.
- During monsoon period, the treated wastewater will be utilized as makeup water for Rolling Mill.
- Garland drains will be provided around all the raw material stacking areas.
- No effluent will be let out of the plant premises. Zero effluent discharge will be implemented.

TREATED EFFLUENT DISPOSAL

Total treated Effluent generation (inclusive of sanitary waste water)	: 1738 KLD
Treated effluent to be used for ash conditioning	: 150 KLD
Treated effluent to be used for CT makeup	: 1046 KLD
Treated effluent to be used for dust suppression in CHP	: 242 KLD
Treated effluent to be used for Floor washing, Vehicle washing	: 10 KLD
Treated effluent be used for Greenbelt development	: 290 KLD

14.26 Ha. (35.21 Acres) of greenbelt (inclusive of existing) will be developed by using the treated effluent. Treated effluent which is proposed to be utilized for greenbelt during non-monsoon period, will be used as make up water for Rolling Mill, during monsoon.

7.3 Noise Environment

- The major noise generating sources in the plant will be STG, boiler, feed pumps, steam blowing from boiler, D.G. Sets.
- Acoustic enclosures will be provided to STG & D.G. set.
- Quench water Silencer will be provided to prevent the noise during steam blowing.
- All machinery will be manufactured as per MoEF&CC/OSHA & other international standards on noise levels.
- The noise levels will be confined to the working zones of the plant.
- Ear plugs will be provided to all employees who will enter into the noise prone areas.
- Community noise levels are not likely to be affected due to the proposed thick green belt and attenuation due to the physical barriers.
- The ambient noise levels will be in accordance with MoEF&CC norms i.e. ambient noise levels will be < 75 dBA during daytime and < 70 dBA during night time.

7.4 Land Environment

The waste water generated from the proposed project will be treated in the Effluent Treatment Plant to comply with the SPCB standards and will be used for dust suppression, ash conditioning and for greenbelt development. All the required Air emission control systems will be installed and operated to comply with SPCB norms. Solid wastes will be disposed off as per norms. Extensive greenbelt will be developed in the plant premises. Desirable beautification and landscaping practices will be followed. Hence there will not be any impact due to the proposed expansion project.

Solid waste generation and disposal

S.No.	Waste	Quantity (TPA)			Proposed method of disposal
		Existing	Expansion	Total	
1.	Ash from DRI	---	41,580	41,580	Will be utilized in the proposed Brick Manufacturing Unit
2.	Dolochar	---	46,200	46,200	Will be used in proposed CFBC power plant

S.No.	Waste	Quantity (TPA)			Proposed method of disposal
		Existing	Expansion	Total	
					as fuel.
3.	Kiln Accretion Slag	---	2,079	2,079	Will be utilized in the proposed Brick Manufacturing Unit
4.	Wet scrapper sludge	---	9,240	9,240	Will be utilized in the proposed Brick Manufacturing Unit
5.	SMS Slag	---	19,800	19,800	Slag from SMS will be crushed and iron will be recovered & then remaining non - magnetic material being inert by nature will be used for Road construction.
6.	End Cuttings from Rolling Mill	---	4,544	4,544	Will be reused in the SMS
7.	Mill scales from Rolling Mill	---	535	535	Mill scales will be recycled to Ferro alloys unit.
8.	Ash from Power Plant	49,474	49,474	98,948	Will be utilized in the proposed Brick Manufacturing Unit
9.	Dust from Sinter plant	---	660	660	Will be utilized in the proposed Brick Manufacturing Unit
10.	Slag from FeMn	30000	150000	180000	Partly will be reused in manufacture of SiMn as it contains high SiO ₂ and Silicon & remaining will be given to near by Ferro Alloy unit.
	(or)				
11.	Slag from FeSi	3920	5880	9800	Will be given to Cast iron foundries
	(or)				
12.	Slag from SiMn	30000	108000	138000	will be used for Road construction / will be given to slag cement manufacturing
	(or)				
13.	Slag from FeCr	27000	97200	124200	Will be processed in Zigging plant for Chrome recovery. After Chrome recovery, the left-over slag will be analysed for Chrome content through TCLP test, if the Chrome content in the slag is within the permissible limits, then it will be utilised for Road laying / brick manufacturing. If Chrome content exceeds the permissible limits, it will be sent to nearest TSDF.
	(or)				
14.	Slag from Pig Iron	---	108000	108000	Will be given to cement manufacturing unit
15.	Dust from APCS	660	2640	3300	Will be utilized in the proposed Brick Manufacturing Unit

7.5 Greenbelt Development

- Existing plant is located over an extent of **22.50 Ha. (55.61 Acres)** out of this 33.14% of the area i.e. **7.46 Ha. (18.42 Ac)** has been developed with greenbelt.
- **15500 nos.** of plants are exists till date.
- After proposed expansion **14.26 Ha. (35.21 Ac.)** i.e. **33.80%** of land is envisaged for greenbelt out of the total **42.17 Ha. (104.16 Acres)** of land.
- It is proposed to plant another **20150 nos.** of plants as part of expansion.
- Local DFO will be consulted in developing the green belt.
- No cutting of Trees is envisaged as part of expansion.
- Major part of the additional land covered with Shrubs which will be removed.
- It has been proposed to develop 10 meters wide green belt along the periphery inside the factory premises.
- 2500 plants will be planted per hectare as per CPCB norms.

7.6 Cost for Environment Protection

Capital Cost for Environment Protection for proposed expansion : Rs. 54.4 Crores

Recurring Cost per annum for Environmental protection : Rs.9.0 Crores

7.7 Implementation of CREP Recommendations

All the CREP recommendations will be implemented & followed strictly.

- Continuous stack monitoring system is proposed for stack attached to WHRB & FBC Boiler.
- Online Ambient Air Quality Monitoring Stations will be established in consultation with SPCB during operation of the plant.
- Fugitive emission monitoring will be carried out as per CPCB norms.
- Energy meters will be installed for all the pollution control systems.
- Additional Rain water harvesting pits will be constructed outside the plant premises in consultation with CGWB.